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INTELLIGENT TRANSPORT SYSTEM FOR PUBLIC TRANSPORT: NEED OF THE HOUR

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ABSTRACT:

Transportation is a driving force behind development and the well being of all people around the world. Modern life demands growing mobility. Frequently it is secured through ever-increasing use of private cars. The resulting burdens on the transport infrastructure, that is already heavily stretched, are multiplying. Despite major expenditures on new road infrastructures, traffic congestion continues to rise. Past gains in road safety and environmental improvements are decreasing. It is unlikely that these problems can be solved simply by building more roads or by relying on past approaches. Innovative efforts are clearly needed on a broad front. Among this is the concept, and the practice, of intelligent transport systems (ITS) which can open up new ways of achieving sustainable mobility in our communications and information society. ITS are transport systems that apply information, communications, and the control technologies to improve the operation of transport networks. ITS tools are based on three core features-information, communications and integration-that help operators and travellers make better and coordinated decisions. Through improvement of operations, ITS tools are used to save time and lives, to enhance the quality of life and the environment, and to improve the productivity of commercial activities. An ITS includes both technical and institutional components. Since the ITS components work synergistically with each other, their formal relationship can be depicted by an architecture. This paper summarises the overview of ITS , various purposes, functions of ITS, and applications of an ITS for India.

KEYWORDS: *Information and Communication Technologies,ITS, Traffic Signal Control Systems.*

INTRODUCTION :

Intelligent Transport Systems (abbreviated to I.T.S. and written ITS) refers to the use of information and communication technologies in transport. The development of ITS is still evolving. The extent to which these technologies are used – and the degree of sophistication in their deployment – varies from one country to another. Transport professionals around the globe need to understand the principal applications and capabilities of ITS so they can assess potential advantages, associated costs and how ITS may best be deployed.

Intelligent Transport Systems (ITS) are the control and information systems that use integrated communications and data processing technologies for the purposes of:

- improving the mobility of people and goods

- increasing safety, reducing traffic congestion and managing incidents effectively
- meeting transport policy goals and objectives – such as demand management or public transport priority measures

Integrated Components of an Intelligent Transportation System There are nine integrated components of an ITS. These components include traffic signal control, freeway management, transit management, electronic fare payment, electronic toll payment, incident management, traveler information services, emergency management services and railroad grade crossing safety. Traffic Signal Control Systems use in-pavement detectors to monitor the current demand. These systems measure the demand for right-of-way, shifts in directional demand, and changes in cross-street directional demand. The detectors relay this information to the traffic signals, which can then adapt to the current needs of the vehicles. The result is a smoother flow of traffic, with shorter waiting times. As a safety measure, automatic cameras at signalized intersections have reduced the numbers of speeders and red-light runners, by photographing license plate numbers and fining the violators. Freeway Management Systems Freeway Management Systems use ramp metering techniques to measure and regulate how much traffic is entering and leaving major freeways. The metering rate ensures that demand remains below capacity, reducing congestion. Metering rates also improve safety by breaking up groups of merging vehicles competing for space in the stream of traffic. Cities using Freeway Management Systems report handling more traffic while maintaining or increasing travel speeds. Transit Management Transit Management includes Automatic Vehicle Location (AVL) technologies and computer-aided dispatch systems to help keep buses on schedule and improve service. 4 Some cities have integrated the bus system with the traffic light system at key intersections. This increases the green lights along these routes by only a few seconds, but the end result is a reduction in transit travel time. Electronic Fare Payment Technologies Electronic Fare Payment Technologies have reduced cash-handling costs for transit operators, due to more accurate data collection. This method is also more convenient for the passengers, who no longer have to worry about having the correct change for fare payment. Electronic Toll Payment Electronic Toll Payment allows travelers to speed through toll collection plazas without stopping to pay their toll. A roadside sensor locates a transponder in the approaching vehicle, and automatically bills the corresponding account. This results in significantly reduced levels of vehicle emissions. Incident Management Systems Incident Management Systems include dynamic message signs, which alert travelers to accidents or stalled vehicles on the road ahead. Video cameras and road sensors help to detect and locate incidents quickly, and computer-aided dispatch can speed emergency services to the scene. Traveler Information Services Traveler Information Services utilize many modes of communication, such as the internet, radio, kiosks, pagers, dial-up services, television, and on-board computers. These services allow travelers to access pre-trip and en route information so they can plan the most efficient route for their needs. Also available is information on all modes of public transportation and ridesharing in the area, as well as specialized services for senior citizens or persons with disabilities. Emergency Management Services Emergency Management Services are greatly enhanced by traffic control centers that continually monitor roadway conditions. When an incident occurs, the nearest emergency service vehicle is located electronically and dispatched to the scene. Highway managers then alert other drivers of the incident through dynamic message signs. These services reduce response times, help save lives, and reduce the occurrence of secondary incidents. 5 Railroad Grade Crossing Safety Railroad Grade Crossing Safety can be increased by using signing systems that alert drivers to approaching crossings and oncoming trains. The signing system for buses includes a wireless antenna built into the railroad sign and an in-vehicle communicator that alerts the driver to the railroad crossing and any oncoming trains.

Function of ITS

ITS aims to serve the user of the transport system by providing– for the individual – more reliability and comfort for individual mobility and – for the operator of the transport system – more effective operations and decision making. The overall function of ITS is to improve the operation of the

entire transport system (often in real-time) for transport network controllers, travellers, shippers and other users.

ITS deployment is influenced by commercial interests and policy initiatives at the international, national, regional and local level – which impact on the business practices of stakeholders in the public or private sector.

ITS provides a flexible approach to addressing common transport problems – one that emphasises the use of information, optimal decision-making and a high level of system adaptability. This compares with the more traditional approach of building additional road infrastructure and adding physical capacity. ITS offers alternatives to meeting future travel demand in situations where conventional approaches may not work – for example in heavily built-up locations or in areas subject to stringent environmental regulations.

More specifically, ITS includes a variety of tools, such as sensing, communications, and computing technologies – which can be applied in an integrated way to the transport system to improve its efficiency, safety, sustainability and the resilience of network operations in the events of serious disruption.

ITS Applications and Services

The use of technology to manage transport systems, and to improve their efficiency and safety, has a long history that predates the first use of the term "ITS" in the 1990s.

Among the first examples of technology applied to road transport were urban traffic signal control systems – with increasing levels of sophistication over time (in terms of sensing vehicle presence and control logic). Their purpose was to control traffic at road intersections to improve traffic flow and safety. Other early ITS applications were for motorway incident detection and improving the information available for travellers – with real-time traffic alerts and roadside Variable Message Signs.

In the 1990s, there was increased recognition of the negative impacts of road transport (such as congestion, accidents and pollution) and the search began for solutions to the challenges that facing large, congested, metropolitan areas. The traditional solution of adding capacity by improving the road infrastructure was often no longer viable – for example, because of environmental concerns or the unavailability of space. These factors combined to motivate transport professionals to investigate the potential for utilising advanced technologies – such as sensing, communications and computing – to improve the performance of road networks.

ITS deployment is now almost ubiquitous in developed countries and has begun to take root in many emerging economies as well. The range of potential applications for ITS, has dramatically increased. Whereas initially the focus was on stand-alone applications, there are now examples of truly integrated systems – solutions that look at the transport system as an integrated whole – for example, integrated multimodal ticketing.

Applications of ITS

- Traveller information
- Traffic management
- Demand management
- Road management
- Advance driving assistance
- Electronic Financial Transactions
- Commercial Vehicle Management
- Public Transport Management
- Incident and Hazard Response

ITS Initiatives in India

- Several ETC (Electronic Toll Collection) planned – Pilot project on Chandigarh-Parwanoo on NH-5 – Ahmedabad-Mumbai Highway (RFID-based)
- ITS on BRT Corridors – Signal priority , Vehicle Tracking and Automatic Fare Collection in Indore BRT – Pimpri-Chinchwad (Pune) planned ITS implementations for BRT
- ITS in Parking– APMS (Advanced Parking Management Systems) in Delhi – Parking lot at Palika Bazar – Capacity to park 1050 cars and 500 two wheelers - Electronic Parking Guidance and VMS Smart Cards – Automated multi-level parking in Sarojini Nagar Market implemented; several issues in implementation
- ITS Master Plan for Hyderabad
  – implemented in in three phases spread over 10 years at a cost of Rs 1,180 crore
  – Automatic Traffic Counter-cum-Classifiers (ATCC), CCTVs, Variable Messaging System, Traffic Signals, Pedestrian Signals, Flood Sensors, Weather Stations, Pollution Sensors
- B-TRAC, Bangalore
  – Initiated by Bangalore Traffic Police

CONCLUSION

ITS improves transportation safety and mobility and enhances global connectivity by means of productivity improvements achieved through the integration of advanced communications technologies into the transportation infrastructure and in vehicles. Intelligent transportation systems encompass a broad range of wireless and wire line communication based information and electronics technologies to better manage traffic and maximize the utilization of the existing transportation infrastructure. It improves driving experience, safety and capacity of road systems, reduces risks in transportation, relieves traffic congestion, improves transportation efficiency and reduces pollution.

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